

Plume Stability: Appendix 3

General Policy
Default Procedure

Plume Stability Policy

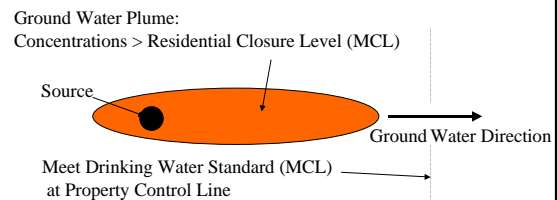
- Definition: A closure objective or criteria for ground water in which the zone of constituent impact in the ground water:
 - 1) is not increasing in size or concentration, and
 - 2) is not migrating
- Plume stability is demonstrated using a default or non-default stability monitoring method.

Plume Stability Policy Cont.

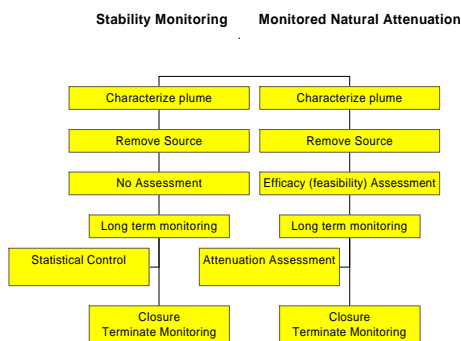
- If a ground water plume is shown to be stable, the site (ground water) can be closed, and ground water monitoring can be terminated
- Default and non-default methods
 - Default is the 7 year monitoring method
 - Non-default may be a different statistical or modeling demonstration to supplement the long term monitoring

Plume Stability Policy

The Residential Closure Level must not be exceeded beyond the property line (unless property control is established).



Stability Monitoring -vs- Monitored Natural Attenuation



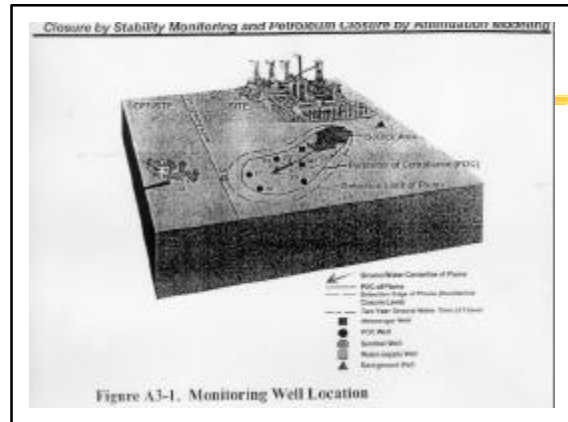
Source Considerations:

Removal & Center of Ground water Plume

- To Qualify for Plume Stability, the Source must be Removed
 - All free product must be removed
 - Vadose soil must not have potential to expand plume
- Source at Center of Plume:
 - Since the center of the ground water plume has potential to expand plume, the plume zone of highest concentrations becomes the new "potential" source.

Types of Wells

- Messenger Wells
 - In the most contaminated Areas
 - One year and Two Year GW Travel Times
- Perimeter of Compliance (POC) Wells
 - At least 3 required
 - Located at approx. the closure level
- Background Wells and Sentinel Wells
 - Typical use, protects receptors



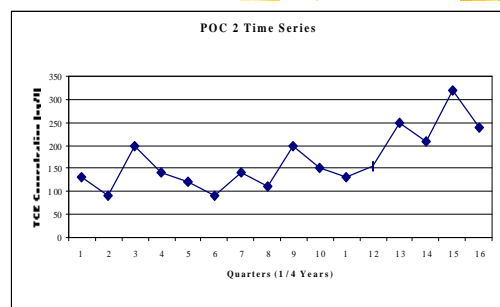
Default Procedure

- Two year Initial Stability Monitoring Period
 - Eight Quarterly Samples
 - Mann-Kendall Trend Test
- Continue Quarterly Monitoring if the Initial Monitoring Shows Stability (no trend)
- Perform the M-K Test for 5 more Years
- If all Tests Passed, may be eligible for Closure.

Default Procedure Evaluation

- Trend test for:
 - All quarterly data (all years)
 - Last 8 quarters (recent trend)
- POC Wells:
 - For each constituent at each well: Any single trend = Expanding Plume
- Messenger Wells:
 - Only one well may show trends
 - Other wells may not show any trend

Mann-Kendall Trend Data



Attenuation Modeling

- * Petroleum Sites Only
State of Ohio Policy

Stability data modeled and next four quarters are predicted

The next four quarters are monitored and compared to predictions

If the monitored data matches the predictions (tight control), eligible for closure



Plume Stability